Reduction by Dominance

4/13/16

Ratings game:

$$\begin{bmatrix} -2 & 1 & -2 & 2 \\ -1 & 1 & -1 & 2 \\ -2 & 0 & 0 & 1 \\ 3 & 1 & -1 & 1 \end{bmatrix}$$

Def^n: A row of a payoff matrix dominates another row if every entry of the first is at least as large as every entry of the second.

In the matrix above, the second row dominates the first

Def^n: A column of a payoff matrix dominates another column if every entry of the first is no larger than every entry of the second.

In the matrix above, column three dominates column four and column two.

Reduction by dominance: iteratively remove dominated rows/columns, until there are no dominated rows/columns.

Eg.:

$$\begin{bmatrix} -2 & 1 & -2 & 2 \\ -1 & 1 & -2 & 2 \\ -2 & 0 & 0 & 1 \\ 3 & 1 & -1 & 1 \end{bmatrix} \xrightarrow{\text{Remove columns 2 \& 4}} \begin{bmatrix} -2 & -2 \\ -1 & -2 \\ -2 & 0 \\ 3 & -1 \end{bmatrix}$$

Row 4 dominates rows 1 & 2, remove those rows

		1/6 Nature doc	Ballet 5/6
2/3	Reality show	-2	0
1/3	Movie	3	-1

The optimal strategy for RTV is to play the first row 2/3 of the time, the optimal strategy for CTV is to play the first column 1/6 of the time, the expected payoff is $-1/3$.

Details are on 273.